Features, Events, and Processes For the CRA

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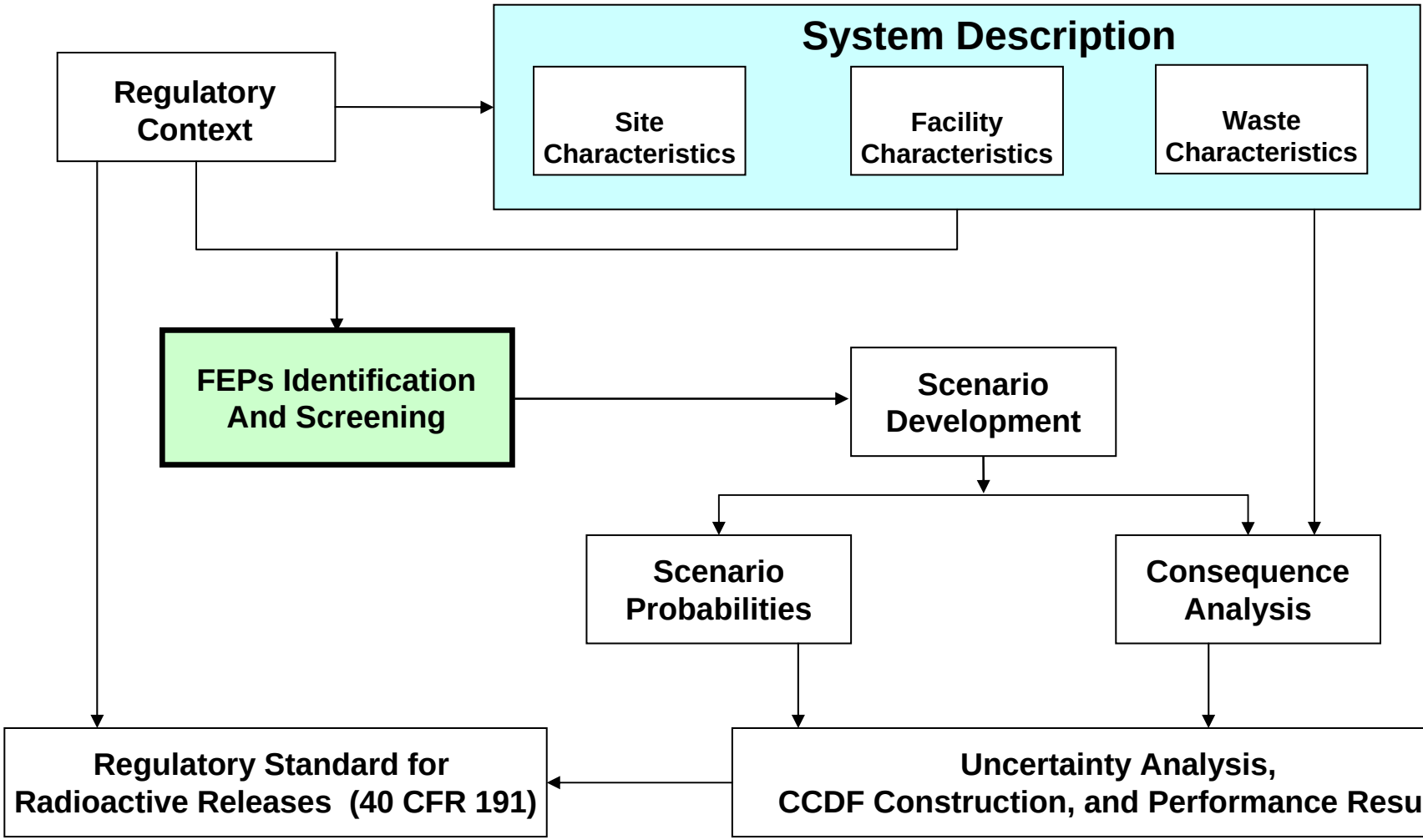
PA Methodology



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FEPs Process

- **FEPs Selection – Creative & Comprehensive**
- **FEPs Screening – Is it appropriate to include in PA?**
- ***Screening Arguments* are used to describe the FEP and its relevance/applicability to WIPP**
- ***Screening Decisions* state whether the FEP is included in PA and why**
  - **Screened Out – Regulation (SO-R)**
  - **Screened Out – Consequence (SO-C)**
  - **Screened Out – Probability (SO-P)**
  - **Screened In – Undisturbed Performance (UP)**
  - **Screened In – Disturbed Performance (DP)**

Origin of WIPP FEPs List

- **Early WIPP FEPs list was an amalgamation of several existing FEPs lists from other international programs**
  - **SKI & Swedish Nuclear Fuel list (Andersson 1989)**
  - **United Kingdom (Thorne 1992)**
  - **Nuclear Energy Agency (NEA 1992)**
  - **Atomic Energy of Canada list (Goodwin et al. 1994)**
- **Resulted in over 1,200 FEPs with much duplication and many non-applicable FEPs**
- **Assured comprehensiveness**

Origin of WIPP FEPs List (cont.)

- **1995 Draft CCA used international lists to develop a WIPP-specific list**
  - **Nine categories of FEPs**
  - **Reduced 1,200 FEPs by approximately one-half**

- **1996 CCA further refined FEPs list to remove duplication (note: *refinement* not screening)**
  - **Three categories of FEPS**
    1. **Human Activities FEPs**
    2. **Natural FEPs**
    3. **Waste & Repository FEPs**
  - **Resulted in 237 FEPs for CCA (baseline FEPs)**

CRA FEPs Reassessment Drivers

- 40 CFR §194.15, *Content of Compliance Recertification Applications* states:

  Updated documentation shall include:

  (a) (4) An identification of any activities or assumptions that deviate from the most recent compliance application….

  (6) Any significant information not previously included in a certification or re-certification application….

- EPA also states,

  "We expect a CRA to include descriptions of:

  …changes to Features, Events, and Processes (FEPs) identified in the CCA and any subsequent recertification application. We expect that changes to FEPs will be included in a performance assessment, and that this work will be documented in the recertification application." – EPA Recertification Guidance, December 2000

CRA FEPs Reassessment Drivers

- **August 6, 2002 EPA Letter**

"Reevaluation of FEPs screening

The features, events and processes considered for the original certification application must be reviewed to determine if the original screening decisions are still applicable. We expect that most FEPs have not changed, but we expect that the CRA will demonstrate that all FEPs have been reconsidered and identify which, if any, FEPs have been modified and how."

CRA FEPs Reassessment Process

- **Conducted per SNL AP-095**
  - Systematic Process
  - Documents reassessment
  - Follows SNL QA requirements

- **Primary purpose is to *update* screening arguments with any applicable new or different information since CCA**

Reassessment Focus Areas

- **Human Activities FEPs are of interest because they are most susceptible to change**
  - **have new practices or technologies emerged since the CCA?**
- **Natural FEPs associated with monitoring data**
  - **do monitoring data since CCA affect screening arguments or decisions?**
- **Waste and Repository FEPs**
  - **do emplaced waste data, or projected waste information alter previous screening arguments or decisions?**

Reassessment Results

- **Of the 237 Baseline FEPs:**
  - **106 have not changed**
  - **120 screening *arguments* have been updated with new information**
  - **4 have been combined with similar FEPs**
  - **7 have changes in screening *decisions***
  - **2 have been added (separated from other more general FEPs)**
- **CRA contains 235 FEPs**
- **FEPs Screening is documented in Appendix PA, Attachment SCR**

Summary of Changes

FEP I.D.	FEP Name	Summary of Change
FEPs Combined with other FEPs		
N17	***Lateral Dissolution***	Combined with N16, ***Shallow Dissolution.*** N17 removed from baseline.
N19	***Solution Chimneys***	Combined with N20, ***Breccia Pipes***. N19 removed from baseline.
H33	***Flow Through Undetected Boreholes***	Combined with H31, ***Natural Borehole Fluid Flow***. H33 removed from baseline.
W38	***Investigation Boreholes***	Addressed in H31, ***Natural Borehole Fluid Flow,*** and H33, *"**Flow Through Undetected Boreholes**."* W38 removed from baseline.
FEPs With Changed Screening Decisions		
W50	***Galvanic Coupling***	SO-P to SO-C
W68	***Organic Complexation***	SO-C to UP
W69	***Organic Ligands***	SO-C to UP
H27	***Liquid Waste Disposal***	SO-R to SO-C
H28	***Enhanced Oil and Gas Production***	SO-R to SO-C
H29	***Hydrocarbon Storage***	SO-R to SO-C
H41	***Surface Disruptions***	SO-C to UP (HCN)
New FEPs for CRA		
H58	***Solution Mining for Potash***	Separated from H13, ***Potash Mining.***
H59	***Solution Mining for Other Resources***	Separated from H13, ***Potash Mining.***

FEPs Combined for CRA

- **"*Dissolution*" combined with "*Shallow Dissolution*"**
  - **Extensive overlap between these two FEPs in the CCA; CRA combines and addresses as one**
- **"*Solution Chimneys*" combined with "*Breccia Pipes*"**
  - **virtually equivalent as discussed in the CCA; consolidated as one**
- **"*Flow Through Undetected Boreholes*" combined with "*Natural Borehole Fluid Flow*"**
  - **Natural Borehole Fluid Flow description modified to include unknown boreholes.**
- **"*Investigation Boreholes*" addressed in "*Natural Borehole Fluid Flow*"**
  - **Natural Borehole Fluid Flow description modified to include Investigation Boreholes**

FEPs with Revised Screening Decisions

- **Galvanic Coupling (W50) – SO-P to SO-C**
  - **Two Galvanic Coupling FEPs (W50 & W95)**
  - **W50 relates to coupling within the repository; W95 relates to zones outside the repository**
  - **CCA confused and sometimes discussed each simultaneously; They each shared SO-P screening decision**
  - **CRA distinctly discusses each appropriately and changes W50 from SO-P to SO-C**

FEPs with Revised Screening Decisions

- ***Organic Complexation*** **(W68) SO-C to UP**

- ***Organic Ligands*** **(W69) SO-C to UP**
  - **EPA Letter of August 6, 2002 requests that the FMT reflect new experimental data**
  - **Therefore, the new FMT database accounts for Complexation of Organic Ligands; the FMT results are then used in subsequent transport codes in PA**

FEPs with Revised Screening Decisions

- ***Liquid Waste Disposal*** **(H27) SO-R to SO-C**
- ***Enhanced Oil and Gas Production*** **(H28) SO-R to SO-C**
- ***Hydrocarbon Storage*** **(H29) SO-R to SO-C**
  - **Modeling studies requested by EPA since the CCA (Stoelzel and Swift 1997) show effects of injection to be of no consequence**
  - **No modeling changes required; FEPs remain screened out**

FEPs with Revised Screening Decisions

- ***Surface Disruptions*** **(H41) SO-C to UP (for historic, current, and near future events)**
  - **Surface Disruptions having the potential to affect the disposal system (e.g. disposal of potash effluent) are included in our modeling of current conditions (i.e., heads) at and around the site**
  - **No modeling changes needed; correction made to accurately reflect the proper screening decision**

New FEPs for CRA

- *Solution Mining for Potash* (H58) SO-R
- Not previously included in WIPP FEPs baseline as discrete FEP
  - addressed in a piecemeal fashion (e.g. in Gas Storage, Potash Mining, and Drilling for Other Resources).
- Potash mining using conventional methods is accounted for in PA (screened in) per EPA regulations (40 CFR 194.32)
  - Potash mining via conventional methods is currently ongoing within the Delaware Basin
  - Potash mining via solution mining is not currently occurring within the Delaware Basin; therefore SO-R
- No modeling changes necessary (screened out)

New FEPs for CRA

- *Solution Mining for Other Resources* (H59) SO-C
- Solution Mining not previously included in WIPP FEPs baseline as discrete FEP
  - Also addressed in a piecemeal fashion (e.g. in Gas Storage, Potash Mining, and Drilling for Other Resources).
  - Solution Mining for Other Resources e.g., salt or brine does occur within the basin, but does not affect repository performance; therefore SO-C (see also EPA CARD 32.B.5)
- Separation clarifies all related FEPs descriptions, arguments, and resulting decisions.
- No modeling changes necessary; FEP continues to be screened out

Conclusions

- **FEPs for CRA have been reevaluated**
- **Reevaluation results in:**
  - **Updates (Organic Ligands now accounted for)**
  - **Refinements (Specifically addresses solution mining processes)**
  - **Corrections (combining redundant FEPs)**
- **FEPs screening for the CRA is not significantly different than the CCA, but now reflects the most recent information available**